

WHAT IS CLAIMED IS:

1. A method of assembling a gas turbine engine, said method comprising:

providing a rotor assembly including a rotor shaft and a rotor disk that includes a radially outer rim, a radially inner hub, and an integral web extending therebetween, wherein the rotor assembly is rotatable about an axis of rotation extending through the rotor shaft; and

coupling a disk retainer including at least one discharge tube to the rotor disk wherein the discharge tube extends outwardly from the disk retainer for pumping and then discharging cooling fluid therefrom in a direction that is substantially perpendicular with respect to the axis of rotation.

2. A method in accordance with Claim 1 wherein coupling a disk retainer including at least one discharge tube to the rotor disk further comprises coupling a disk retainer to the rotor disk such that the at least one discharge tube is positioned between an aft cooling plate and an integrally-formed disk stub shaft.

3. A method in accordance with Claim 2 wherein coupling a disk retainer to the rotor disk further comprises coupling the disk retainer to the rotor disk such that the aft cooling plate is coupled against the rotor disk web and such that the disk stub shaft is coupled to the rotor shaft.

4. A method in accordance with Claim 2 wherein coupling a disk retainer including at least one discharge tube to the rotor disk further comprises coupling the disk retainer to the rotor disk such that the at least one discharge tube is coupled in flow communication to a bore cavity defined at least partially by the rotor disk radially inner hub.

5. A method in accordance with Claim 2 wherein coupling a disk retainer including at least one discharge tube to the rotor disk further comprises coupling an annular disk retainer to the rotor disk that includes a plurality of discharge tubes spaced circumferentially around the rotor shaft.

6. A rotor assembly for a gas turbine engine including a centerline axis of rotation, said rotor assembly comprising:

a rotor shaft;

a rotor disk coupled to said rotor shaft and comprising a radially outer rim, a radially inner hub, and an integral web extending therebetween; and

a disk retainer coupled to said rotor disk and comprising at least one discharge tube extending radially outwardly from said disk retainer for pumping and then discharging cooling fluid therefrom in a direction that is substantially perpendicular with respect to the gas turbine engine axis of rotation.

7. A rotor assembly in accordance with Claim 6 further comprising a cooling circuit in flow communication with disk retainer discharge tube, said cooling circuit configured to supply bleed air to said at least one discharge tube, said at least one discharge tube discharges cooling fluid downstream from said rotor disk radially outer rim.

8. A rotor assembly in accordance with Claim 6 wherein said disk retainer further comprises a disk stub shaft and an integral aft cooling plate, said at least one discharge tube between said disk stub shaft and said aft cooling plate, said disk stub shaft coupled to said rotor shaft.

9. A rotor assembly in accordance with Claim 6 further comprising a cooling circuit coupled in flow communication to a cooling fluid source, a bore cavity, and to said at least one discharge tube, said bore cavity defined at least partially by said rotor disk hub, said at least one discharge tube for pumping and then discharging cooling fluid from said bore cavity.

10. A rotor assembly in accordance with Claim 9 wherein said at least one discharge tube facilitates

discharging cooling fluid at a positive pressure downstream from said rotor disk radially outer rim.

11. A rotor assembly in accordance with Claim 6 wherein said at least one discharge tube comprises a plurality of circumferentially-spaced discharge tubes extending around the gas turbine engine axis of symmetry.

12. A rotor assembly in accordance with Claim 6 wherein said at least one discharge tube is configured to increase the pressure of cooling fluid flowing therethrough.

13. A gas turbine engine comprising a rotor assembly comprising a rotor shaft, a rotor disk, and a disk retainer, said rotor shaft having a centerline axis of rotation, said rotor disk coupled to said rotor shaft and comprising a radially outer rim, a radially inner hub, and an integral web extending therebetween, said disk retainer coupled to said rotor disk and comprising at least one discharge tube extending radially outwardly from said disk retainer, said discharge tube for discharging cooling fluid in a direction that is substantially perpendicular to said rotor shaft axis of rotation.

14. A gas turbine engine in accordance with Claim 13 further comprising a cooling circuit comprising a sump buffer cavity and a bore cavity, said bore cavity coupled in flow communication with said sump buffer cavity, said bore cavity defined at least partially by said rotor disk inner hub and coupled in flow communication to said at least one discharge tube.

15. A gas turbine engine in accordance with Claim 14 wherein said cooling circuit supplies cooling fluid to said at least one discharge tube, said at least one discharge tube discharges cooling fluid from said bore cavity into a cavity defined downstream from said rotor disk radially outer rim.

16. A gas turbine engine in accordance with Claim 14 wherein said disk retainer further comprises a disk stub shaft and an aft cooling plate, said at least one discharge tube is between said disk stub shaft and said aft cooling plate, said disk stub shaft coupled to said rotor shaft, said aft cooling plate is coupled against said rotor disk web.

17. A gas turbine engine in accordance with Claim 14 wherein said disk retainer at least one discharge tube facilitates pressurizing cooling fluid flowing therethrough.

18. A gas turbine engine in accordance with Claim 14 wherein said disk retainer at least one discharge tube comprises a plurality of discharge tubes spaced circumferentially around the gas turbine engine axis of symmetry.

19. A gas turbine engine in accordance with Claim 14 wherein said disk retainer at least one discharge tube facilitates reducing an operating pressure within said bore cavity.

20. A gas turbine engine in accordance with Claim 14 wherein said disk retainer at least one discharge tube facilitates extending a useful life of said rotor assembly.